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INITIAL QZ DATE 3/17/98

ENGINEERING DESIGN FILE

Project/Task BWP In Situ VittrificationSubtask Production Scale Cost EstimateEDF Page 1 of 2

Subject : Production Scale Cost Estimate

Abstract : Following is the FY-1989 cost estimate for production scale ISV for treating the TRU contaminated pits and trenches of the Subsurface Disposal Area (SDA) as described in EDF BWP-ISV-007 Rev. 0 (attachment 1). This estimate includes the two options of using either nine or six sets of process equipment along with the estimate for providing power to these units at the RWMC. These two options, six and nine units, were selected to establish the costs required to complete the project in five and eight years of operation respectively. These times assume that the ISV units have been fabricated, checked-out, crews trained, and power upgrades complete prior to the proposed FY-1996 start-up. These costs do not account for the cost associated with research and development to establish the feasibility and to develop the technology for application to the SDA.

Option	Total Estimated Cost for Units (\$)	Total Operational Cost (\$)	Power Upgrade Cost (\$)	Total Cost (\$)
Six units	40,000,000	310,000,000	14,000,000	364,000,000
Nine units	57,000,000	290,000,000	14,000,000	361,000,000

For each of the options the following allowances are made. No additional paved roads or parking lots are needed. For power from the RWMC to the melt sites, allowances are made for 40 foot poles, hardware, and 13.8 KV conductor. For the six unit option, an allowance of 8,400 linear feet of conductor is made. For the nine unit option 12,000 linear feet of conductor is made. These power lines are from dead end pole structures to the saturable reactor transformer. Allowances are also made for lower voltage lines to power the other trailer equipment, but no allowance is made for the transformers. Costs are estimated using shift work so no allowance are made for overtime or weekend work. No allowances are made for an environmental impact statement (EIS), or for a tank truck to carry scrubber solution. Though allowances are made for the cost of disposing the waste.

For power to the RWMC, the estimates include three 20 MVA transformers and 20 miles of of 138 KV poles, hardware and cable. No allowances are made for rock excavation.

Distribution (complete package)

J. L. Landon, B. Charboneau, P. J. Hill, M. R. Schletter, T. L. Rasmussen, S. P. Fogdall,
Project EDF file, ARDC EDF File

Distribution (cover sheet only): EDF serial no. log

Author

J. M. Better

Dept.

E510

Reviewed

Date

Approved

Date

J. L. Landon 6/2/89

J. L. Landon 6/2/89

The estimates are based on the design work being performed by EG&G Idaho, Inc., the equipment being Government Furnished Equipment (GFE), purchased by EG&G, the power line construction being subcontracted. These estimates include directs, indirects, design, inspection, construction management, procurement fees, and project administration costs. Escalation is included to 1996. The total contingency are 26% for the six unit operation, 23% for the nine unit operation, and 35% for the power upgrade. These contingencies are considered reasonable for a project in the planning stage. Refer to the estimate sheets (attachmant 2 and 3) for more detail.

ENGINEERING DESIGN FILE

Project/Task ISV Treatability StudySubtask Large-Scale Demonstration TestEDF Page 1 of 2

Subject : Time Required to Vitrify TRU-Contaminated Pits and Trenches at the SDA

Abstract :

An estimate is obtained for the time required to vitrify the contents of the pits and trenches at the SDA containing TRU waste (trenches 1-10, pits 1-6, 9,10). The following assumptions are made:

- Electrode separation = 10 feet for trenches, 16 feet for pits
- Width of melt = 18 feet for trenches, 30 feet for pits
- Average excavated depth, overburden depth, and dimensions are as given by reference (1).
- Underburden depth = 3 feet
- Run time per melt as a function of total melt depth is given by reference (2).
- overlap between melts = 2 feet
- Calculated process unit times includes 24 hours between melts for moving equipment and 10% for maintenance.

Results

The following table shows the calculated values of the process unit days required for vitrification of trenches 1-10 and pits 1-6,9,10 along with the values of parameters employed in the calculations and other associated calculated quantities (calculations attached). The melt depth denotes the average value of the maximum melt depth (includes overburden, contaminated soil and underburden). The surface area is the estimated actual surface area of the pits and trenches (1). The time/melt is the time required for one melt (does not include the time required to move the equipment or maintenance time). The # of melts is the number of melts required for vitrification, allowing for sufficient overlap between melts and sufficient extra melt around the boundaries (rounded up to nearest multiple of 10). The area vitrified is the actual area vitrified (effective area per melt multiplied by the number of melts). The volume vitrified is the actual volume vitrified (area vitrified multiplied by the melt depth). The process unit days required is the number of days required for vitrification (includes 24 hrs between melts for moving equipment and maintenance time of 10%).

Distribution (complete package) J.L. Landon, B.L. Charboneau

Distribution (cover sheet only): Project EDF file log, EDF serial no. log

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ED00

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James P. Gray 2-21-89

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B.L. Charboneau 2/21/89

TABLE 1 ISV PROCESS CALCULATIONS FOR TRU-CONTAMINATED PITS AND TRENCHES AT THE SDA

Trench, pit #	Melt Depth, ft.	Surface Area, sq. ft.	Time/melt hrs	# of melts	Area vitrified, sq. ft.	melt vol. cu. ft./10 ⁶	Process unit days required
tr.'s 1,5,7,9	18	29,050	62	300	74,700	1.34	1,183
tr.'s 2,3,4,6,8,10	24	47,313	90	490	121,662	2.92	2,560
pit 1	23	30,824	210	60	40,560	0.932.	644
pit 2	25	99,064	300	180	121,680	3.04	2,673
pit 3	18	47,230	150	100	67,600	1.22	798
pit 4	22	104,979	210	200	135,200	2.97	2,145
pit 5	22	66,952	210	110	74,360	1.64	1181
pit 6	22	54,575	210	90	60,840	1.34	966
pit 9	20	42,802	210	80	54,080	1.08	858
pit 10	24	112,015	300	190	128,440	3.08	2,822
total		634,804		1,800	879,122	19.56	15,830 (44 yrs)

A similar calculation (attached) shows that the time required to vitrify the entire SDA (including the areas between pits and trenches) would be approximately 169 process unit years (includes 24 hours between melts and maintenance time of 10%).

REFERENCES

1. "History of Buried Transuranic Waste At The INEL", March 1977, D.H. Card, EG&G Idaho, Inc.
2. "In Situ Vitrification of Transuranic Waste: An Updated Systems Evaluation and Applications Assessment", March 1987, J.L. Buelt, C.L. Timmerman, K.H. Oma, V.F. FitzPatrick, and J.G. Carter, Pacific Northwest Laboratory, PNL-4800 Suppl. 1, page 116

Calculations of Time Required to Vitrify TRU Waste at the INEL

Assume: electrode separation = 5 m.

melt width = 30 ft.

run time given as a function of melt depth by Figure 57, 58, 59.

time between melts = 24 hours

pits considered:

trenches considered: 1-10

pits considered: 1-6, 9, 10

overburden, underburden vitrified

Trench 1, 5, 7, 9 3 ft. underburden, 2 ft. overlap between settings
maintenance time not included here

Total length = 4150

width = 7 ft.

overburden depth = 5 ft.

excavated depth = 10 ft.

underburden depth = 3 ft.

→ melt depth = 18 ft. \approx 6 m.

run time \approx 150 hrs.

Assume 2 ft. overlap between settings.

→ # of settings $\approx \frac{4150}{(30-4)ft} = 160$ settings

total run time =

$(160)(150) + (160)(24) = 27,840$ hrs. = 1160 days

Trench 2, 3, 4, 6, 8, 10

width = 7 ft.

lengths = 1114, 1124, 1132, 1130, 1132, 1127 ft.

overburden = 5 ft.

total length = 6,759 ft.

exc. depth = 16 ft.

underburden = 3 ft.

→ melt depth = 24 ft. \approx 7.3 m.

→ run time \approx 210 hrs.

Assume 3 ft. overlap between settings.

→ # of settings $= \frac{6,759}{26} = 260$

total run time = $(260)(210 + 24) = 60,840$ hrs. = 2535 days

WATSON

42 387	50	54415	5 SQUARE
42 387	100	54415	5 SQUARE
42 389	200	54415	5 SQUARE

Total? $21.9 \text{ ft} = 1161 + 2,969 = 4,150 \text{ ft.}$

18-4

Trenino: 2, 3, 4, 6, 8, 10

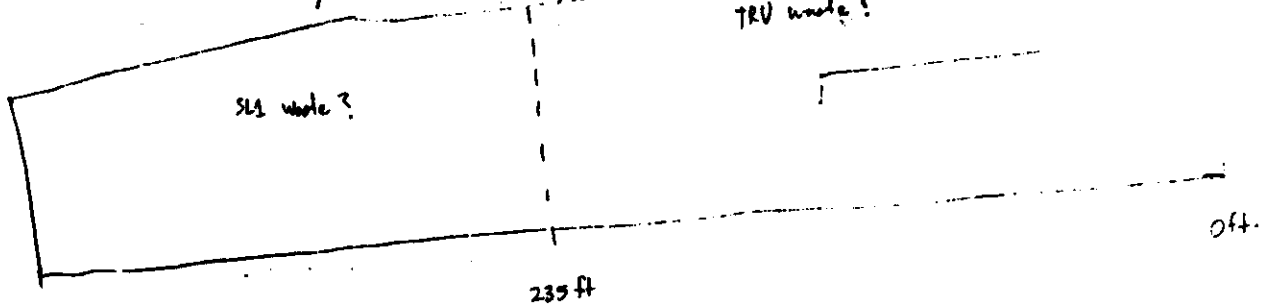
$$\# \text{ of settings } \frac{6,759}{14} = 490$$

Pit 1 surface area = 30,824 ft²

Approximate width = $(30,824 \text{ ft}^2) / 455 \text{ ft.} = 68 \text{ ft.}$

Assume 2 ft. overlap between settings.

TRU work?



→ 3 settings to cover width and allow extra space on sides.

A horizontal number line with tick marks at 0, 20, 40, and 60 ft.

$$\# \text{ of Setlings} = 3 \times \frac{455 \text{ ft.}}{26 \text{ ft.}} = 60$$

exc. depth = 14 ft.

→ max depth = 23 ft. \approx 7m.

total run time = $60(210 + 24) = 14,040$ hrs. = 585 days

Pit 2

Surface Area = 99,064 ft²

Assume Elect. Sp. = 5 m.

"Length" = L₁ + L₂ = 1000 ft. + 150 = 1,150

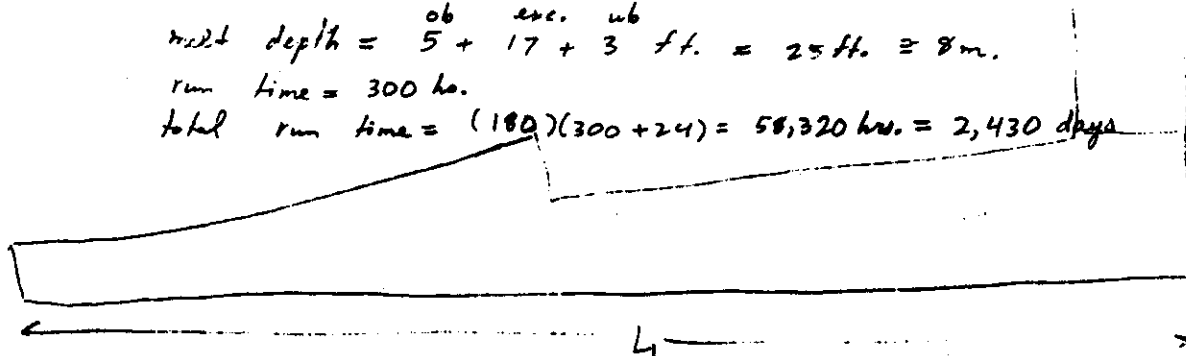
"Width" = (99,064)/1150 = 86 ft. → 4 settings to cover width

$$\# \text{ of settings} = 4 \times \frac{1150}{26} = 180$$

$$\text{melt depth} = \overset{\text{ob.}}{5} + \overset{\text{elec. sp.}}{17} + \overset{\text{wb}}{3} \text{ ft.} = 25 \text{ ft.} \approx 8 \text{ m.}$$

run time = 300 hrs.

$$\text{total run time} = (180)(300 + 24) = 58,320 \text{ hrs.} = 2,430 \text{ days}$$



Pit 3

surface area = 47,230 ft²

width, L = 100 ft. →

"Length" = 47,230/100 = 472 ft.

5 settings per width, 5 m. elec. sp.

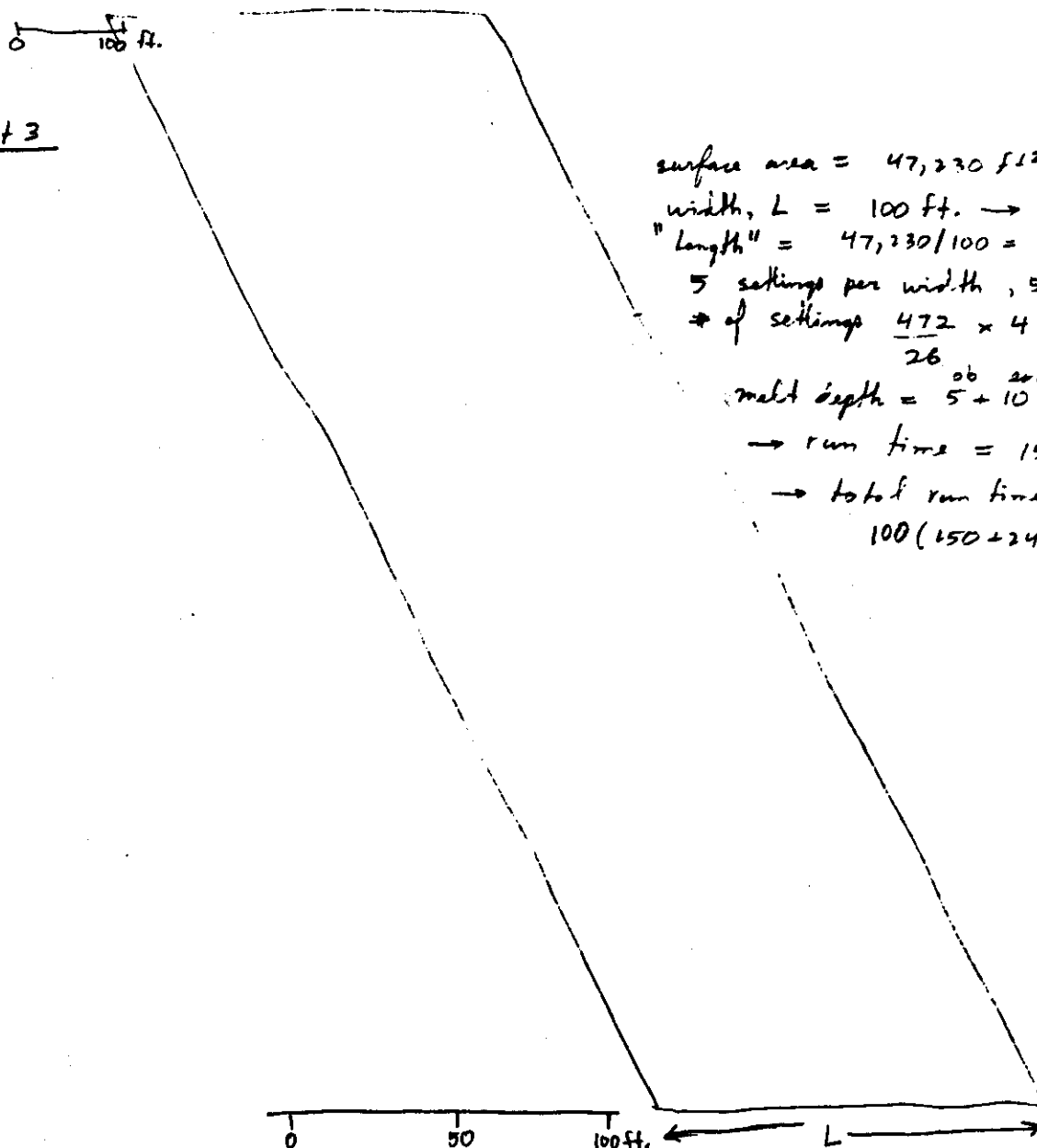
$$\# \text{ of settings} = \frac{472 \times 4}{26} = 100$$

$$\text{melt depth} = \overset{\text{ob.}}{5} + \overset{\text{elec. sp.}}{10} + \overset{\text{wb}}{3} = 18 \text{ ft.} \approx 6 \text{ m.}$$

→ run time = 150 hrs.

→ total run time =

$$100(150 + 24) = 17,400 \text{ hrs.} \\ = 725 \text{ days}$$



Pit 10



Surface area = 112,015 ft²
 width \approx 120 ft. \rightarrow 6 settings/width, 5 m. edge sep.
 length = $\frac{112,015}{120} = 940$ ft.

$$\# \text{ of settings} = \left(\frac{940}{26} \right) (5) = 190$$

$$\text{melt depth} = \frac{0.6}{8} + \frac{\text{ave.}}{13} + \frac{0.6}{3} = 24 \text{ ft.}$$

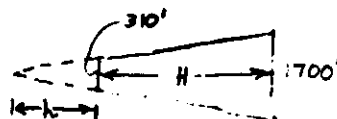
$$\approx 8 \text{ m.}$$

$$\text{run time} = 300 \text{ hrs.}$$

$$\begin{aligned} \text{total run time} &= 190 (300 + 24) \\ &= 61,560 \text{ hrs.} \\ &= 2,565 \text{ days.} \end{aligned}$$

Whole SDA : melt depth (average of above pits) : 22 ft. \approx 7 m (*average);
 run time = 210 hrs.

Assume SDA is iso. Triangle

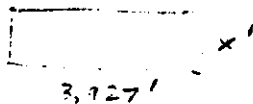


$$\text{Total area} = 88 \text{ acres} = (43,560)(88) = 3,834,000 \text{ ft}^2$$

$$\frac{1}{2}(H+h)(1700) - \frac{1}{2}(310)(h) = 3,834,000 \quad h/H = 310/1700 \quad h = .182H$$

$$1700H + (1850 - 155)h = 3,834,000 = 976.5H \rightarrow H = 3,927 \text{ ft.} \quad h = 715 \text{ ft.}$$

Approximate as rectangle



$$3,927x = 3,834,000$$

$$x = 976'$$

$$\# \text{ of settings per width} = \frac{976}{26} = 38$$

$$\# \text{ of settings } 38 \times \frac{3927}{26} \approx 5,740$$

$$\begin{aligned} \text{total run time} &= 5,740 (210 + 24) \text{ hrs.} \\ &= 1,343,160 \text{ hrs.} = 154 \text{ years.} \end{aligned}$$



Attachment 2

"Providing research and development services to the government"

INTEROFFICE CORRESPONDENCE

Date: February 28, 1989

To: B. L. Charboneau

From: P. J. Hill *PJH 9273*

Subject: IN-SITU VITRIFICATION -- PRODUCTION SCALE - REVISED - PJH-14-89

Cost Estimating has revised planning cost estimates for the subject project. The estimates are for providing production scale equipment for in-situ vitrification at the RWMC. There are two options of using either six or nine sets of equipment for the vitrification. The operating costs are revised to show the cost for each year of operation.

For each option, the following allowances are made. No additional paved roads or parking lots are needed since existing roads are available. These existing roads are currently used to deliver waste to the RWMC burial grounds. Since power supply to the RWMC would require a new power contract with a utility, no allowance is made in this estimate for providing power to the RWMC or for a substation at the RWMC. The power lines which are included do not include a transformer, but allow for 40-foot poles, hardware, and 13.8 KV conductor. For the option with six sets of equipment, an allowance of 8,400 lineal feet of conductor is made. For the option with nine sets of equipment, an allowance of 12,600 lineal feet of conductor is made. These power lines are from dead end pole structures to the saturable reactor transformers. Allowance is also made for lower voltage lines to power the other trailer equipment, but no allowance is made for transformers. No allowance is made for overtime or weekend work, for an Environmental Impact Statement (EIS), or for a tank truck to carry scrubber solution.

The estimates are based on the design work being performed by EG&G Idaho, Inc., the equipment being Government Furnished Equipment (GFE), the power line construction being subcontracted, and the equipment assembly being subcontracted.

These estimates include direct, indirect, design, inspection, construction management, procurement fees, and project administration costs. Escalation is included to 1996. Since current escalation sheets extend only to 1994, the 1994 escalation rates are used for 1995 and 1996. The total contingencies, which include construction management reserve and contingency, are 27 and 24 percent as shown on the summary sheets. These contingencies are reasonable for projects in the early conceptual design phase.

B. L. Charboneau
February 28, 1989
PJH-14-89
Page 2

The total estimated cost of the six unit option is \$40,000,000. The total estimated cost of the nine unit option is \$57,000,000. Please refer to the attached revised summary sheets.

Revised operational costs are included in the attached table. The table is divided into a section on labor costs and a section on consumable costs. All costs are based on a total of 1800 settings operating in 15,830 unit days. These costs will vary depending on how many units are running in which year. Costs are listed according to year of operation. The crew costs are the same for each unit and do not allow for an economy of scale. The electricity cost includes power management costs in addition to the utility costs. Please refer to the attached tables.

For the six unit option, the labor costs are \$90,000,000 and the consumable costs are \$190,800,000. The total operating cost, including a ten percent contingency, is estimated to be \$310,000,000

For the nine unit option, the labor costs are \$82,100,000 and the consumable costs are \$176,800,000. The total operating cost, including a twelve percent contingency, is estimated to be \$290,000,000.

pjh

Attachments:
As Stated

cc: R. W. Bonnenberg *RWB*
Central Files
Project File #8167 *KLS*
P. J. Hill Letter File

COST ESTIMATE SUMMARY

Type of Estimate : Conceptual

File No.: 8167

Date: 02/28/89

Project : In-Situ Vitrification -- Production Scale -- 6 Units

Prepared By : P. J. Hill

Checked/Approved By: AKS

	Unescalated	Escalation	Totals:
Engineering, Design and Inspection (92% of construction)			2,656,000
Performance Specification	0	0	
Title I & II Design	1,100,000 <i>2.6 FTE</i>	352,000	
Title III Inspection	800,000	404,000	
Construction Costs Subtotal			2,888,000
Direct/Indirect Costs		2,269,000	
4000 Improvement to Land	0	0	
5000 Buildings/ Structures	0	0	
6000 Utilities .	0	0	
7000 Equipment	321,000	162,000	
8000 Demolition & Removal	0	0	
Indirect Costs	1,200,000	586,000	
Construction Management		619,000	
Field Engr and Const Mgmt.	259,000	131,000	
Const Mgmt Reserve	152,000	77,000	
Government Furnished Material			23,297,000
Purchased By CM	0	0	
Purchased By	15,487,000	6,492,000	
Procurement Fee	929,000	389,000	
Project Administration Costs			2,819,000
Project Management	1,700,000	822,000	
Project Support	200,000	97,000	
Subtotal			31,660,000
Contingency - 26% of Subtotal			8,340,000
Escalation (included in above totals)		9,512,000	
Total Estimated Cost			40,000,000

COMMENTS: The total contingency for this project, which includes both construction management reserve and contingency, is 27 percent. This is reasonable for a project in the early conceptual design stage.

COST ESTIMATE SUMMARY

Type of Estimate : Conceptual File No.: 8167 Date: 02/28/89

Project : In-Situ Vitrification -- Production Scale -- 9 Units

Prepared By : P. J. Hill

Checked/Approved By: AKS

	Unescalated	Escalation	Totals:
Engineering, Design and Inspection (80% of construction)	
Performance Specification	0	0	3,390,000
Title I & II Design	1,200,000	384,000	
Title III Inspection	1,200,000	606,000	
Construction Costs Subtotal			4,235,000
Direct/Indirect Costs		3,328,000	
4000 Improvement to Land	0	0	
5000 Buildings/ Structures	0	0	
6000 Utilities	0	0	
7000 Equipment	481,000	243,000	
8000 Demolition & Removal	0	0	
Indirect Costs	1,750,000	854,000	
Construction Management		907,000	
Field Engr and Const Mgmt	379,000	192,000	
Const Mgmt Reserve	223,000	113,000	
Government Furnished Material			34,946,000
Purchased By CM	0	0	
Purchased By	23,230,000	9,738,000	
Procurement Fee	1,394,000	584,000	
Project Administration Costs			3,857,000
Project Management	2,300,000	1,112,000	
Project Support	300,000	145,000	
Subtotal			46,428,000
Contingency 23% of Subtotal			10,572,000
Escalation (included in above totals)			13,971,000
Total Estimated Cost			57,000,000

COMMENTS: The total contingency for this project, which includes both construction management reserve and contingency, is 24 percent. This is reasonable for a project in the early conceptual design stage.

IN-SITU VITRIFICATION PRODUCTION SCALE COST ESTIMATE
6 Units

	1996	1997	1998	1999	2000	2001	2002	2003	Total	Basis
LABOR COSTS										
Management										
Management	329,000	349,000	370,000	392,000	416,000	441,000	467,000	495,000	3,259,000	4160 hours/year
Administrative Support	62,000	66,000	70,000	74,000	78,000	83,000	88,000	93,000	614,000	2180 hours/year
Vitrification Crew										
Operator	5,011,000	5,312,000	5,631,000	5,969,000	6,327,000	6,707,000	7,109,000	2,464,000	44,530,000	40 hours/day
Maintenance	501,000	531,000	563,000	597,000	633,000	671,000	711,000	246,000	4,453,000	4 hours/day
Radiation Monitor	2,004,000	2,124,000	2,251,000	2,386,000	2,529,000	2,681,000	2,842,000	985,000	17,802,000	16 hours/day
Engineer	1,365,000	1,447,000	1,534,000	1,626,000	1,724,000	1,827,000	1,937,000	674,000	12,134,000	8 hours/day
Heavy Equipment Crew										
Operator	271,000	287,000	304,000	322,000	341,000	361,000	383,000	129,000	2,398,000	19 hr/setting
Laborer	485,000	514,000	545,000	578,000	613,000	650,000	689,000	231,000	4,305,000	34 hr/setting
Electrician	57,000	60,000	64,000	68,000	72,000	76,000	81,000	27,000	505,000	4 hr/setting
	=====	=====	=====	=====	=====	=====	=====	=====	=====	
Total Labor	9,694,000	10,275,000	10,892,000	11,546,000	12,239,000	12,973,000	13,752,000	4,756,000	90,000,000	
CONSUMABLE COSTS										
Electrodes	17,810,000	18,879,000	20,012,000	21,213,000	22,486,000	23,835,000	25,265,000	8,491,000	157,991,000	
Secondary Wastes	221,400	235,000	249,000	264,000	280,000	297,000	315,000	105,000	1,966,000	
Energy Consumption/Setting, kWh	318,000	318,000	318,000	318,000	318,000	318,000	318,000	318,000		
Energy Cost	3,442,000	3,649,000	3,868,000	4,100,000	4,346,000	4,607,000	4,883,000	1,637,000	30,532,000	
HEPA Filters	34,000	36,000	38,000	40,000	42,000	45,000	48,000	0	283,000	
	=====	=====	=====	=====	=====	=====	=====	=====	=====	
Total Consumables	21,507,400	22,799,000	24,167,000	25,617,000	27,154,000	28,784,000	30,511,000	10,233,000	190,772,000	

Notes: All annual vitrification crew costs are based on 360 days/unit and 6 units/year for the first seven years and 118 days/unit for the eighth year. The heavy equipment crew costs are based on 246 settings per year for the first seven years and based on 78 settings during the eighth year. HEPA Filter costs are based on a 1996 cost of \$5,680 per unit per year. This assumes that filters will be replaced at the end of the year. The labor rate for operators, maintenance workers, radiation monitors, laborers, or electricians is \$58/hour in 1996 dollars; engineers and managers are \$79/hour. The secondary wastes are 2000 L/setting at \$0.45/L in 1996 dollars. The energy cost is \$0.044/kWh in 1996 dollars. The electrodes are \$72,400/setting in 1996 dollars.

IN-SITU VITRIFICATION PRODUCTION SCALE COST ESTIMATE
9 Units

	1996	1997	1998	1999	2000	Total	Basis
LABOR COSTS							
Management							
Management	329,000	349,000	370,000	392,000	416,000	1,856,000	
Administrative Support	62,000	66,000	70,000	74,000	78,000	350,000	
Vitrification Crew							
Operator	7,517,000	7,968,000	8,446,000	8,953,000	8,383,000	41,267,000	40 hours/day
Maintenance	752,000	797,000	845,000	896,000	838,000	4,128,000	4 hours/day
Radiation Monitor	3,007,000	3,187,000	3,378,000	3,581,000	3,353,000	16,506,000	16 hours/day
Engineer	2,048,000	2,171,000	2,301,000	2,439,000	2,297,000	11,256,000	8 hours/day
Heavy Equipment Crew							
Operator	406,000	430,000	456,000	483,000	455,000	2,230,000	19 hr/setting
Laborer	726,000	770,000	816,000	865,000	814,000	3,991,000	34 hr/setting
Electrician	85,000	90,000	95,000	101,000	96,000	467,000	4 hr/setting
	=====	=====	=====	=====	=====	=====	
Total Labor	14,541,000	15,413,000	16,337,000	17,318,000	16,236,000	82,051,000	
CONSUMABLE COSTS							
Electrodes	26,643,000	28,242,000	29,937,000	31,733,000	29,921,000	146,476,000	
Secondary Wastes	331,000	351,000	372,000	394,000	372,000	1,820,000	
Energy Consumption/Setting, kWh	318,000	318,000	318,000	318,000	318,000		
Energy Cost	5,149,000	5,458,000	5,785,000	6,132,000	5,783,000	28,307,000	
HEPA Filters	51,000	54,000	57,000	60,000	0	222,000	
	=====	=====	=====	=====	=====	=====	
Total Consumables	32,174,000	34,105,000	36,151,000	38,319,000	36,076,000	176,825,000	

Notes: All annual vitrification crew costs are based on 360 days/unit and 9 units/year for the first four years and 319 days/unit for the fifth year.
The heavy equipment crew costs are based on 368 settings per year for the first four years and based on 328 settings during the fifth year.
HEPA Filter costs are based on a 1996 cost of \$5,680 per unit per year. This assumes that filters will be replaced at the end of the year. The labor rate for operators, maintenance workers, radiation monitors, laborers, or electricians is \$58/hour in 1996 dollars; engineers and managers are \$79/hour. The secondary wastes are 2000 L/setting at \$0.45/L in 1996 dollars. The energy cost is \$0.044/kWh in 1996 dollars. The electrodes are \$72,400/setting in 1996 dollars.



Attachment 5

"Providing research and development services to the government"

INTEROFFICE CORRESPONDENCE

Date: May 9, 1989
To: J. M. Beller
From: P. J. Hill *PJH*
Subject: ISV PRODUCTION POWER - PJH-32-89

Cost Estimating has prepared a planning cost estimate for the subject project. The estimate is for providing power to the In-Situ Vitrification (ISV) production-scale process.

As requested, the costs include three 20 MVA transformers and 20 miles of 138 KV poles, hardware, and cable. No allowance was made for rock excavation.

The total cost includes design, inspection, directs, indirects, construction management, Government Furnished Equipment (GFE), a procurement fee, project administration, and contingency. The total contingency, which includes construction management reserve and contingency, is set at 35 percent; this is a reasonable contingency for a project in the planning phase. All costs are escalated as shown in the attached escalation sheet. The total cost is estimated to be \$14,000,000.

Please refer to the attached summary and detailed estimate sheets.

pjh

Attachments:
As Stated

cc: R. W. Bonnenberg *RWB*
Central Files
Project File #5101 *AKS*
P. J. Hill Letter File

COST ESTIMATE SUMMARY

Type of Estimate : Planning

File No.: 5101

Date: 05/09/89

Project : ISV Production Power

Prepared By : P. J. Hill

Checked/Approved By: KS

	Unescalated	Escalation	Totals:
Engineering, Design and Inspection (26% of construction)	
Performance Specification	0	0	1,696,000
Title I & II Design	1,035,000	312,000	
Title III Inspection	235,000	114,000	
Construction Costs Subtotal			6,406,000
Direct/Indirect Costs		5,041,000	
4000 Improvement to Land	296,000	143,000	
5000 Buildings/ Structures	0	0	
6000 Utilities	2,458,000	1,189,000	
7000 Equipment	0	0	
8000 Demolition & Removal	0	0	
Indirect Costs	651,000	304,000	
Construction Management		1,365,000	
Field Engr and Const Mgmt	579,000	280,000	
Const Mgmt Reserve	341,000	165,000	
Government Furnished Material			1,862,000
Purchased By CM	0	0	
Purchased By EG&G	1,303,000	523,000	
Procurement Fee	26,000	10,000	
Project Administration Costs			453,000
Project Management	280,000	129,000	
Project Support	30,000	14,000	
Subtotal			10,417,000
Contingency	34% of Subtotal		3,583,000
Escalation (included in above totals)		3,183,000	
Total Estimated Cost			14,000,000

COMMENTS: The total contingency, which includes both construction management reserve and contingency, is set at 35 percent. This is a reasonable contingency for a project in the planning phase.

DETAILED COST ESTIMATE SHEET

PROJECT	ISV Production Power	
LOCATION	INEL	
REQUESTER	J. M. Beller	
<hr/>		
TYPE OF EST.		
	(E) Eng. Est.	
	(V) Vendor	
	(P) Pur. Order	
	(H) Handbook Ref.	
Date:	05/09/89	Page: 1 of 4
Prep. By:	P. J. Hill	chk'd/appr'd By: <i>[Signature]</i>

[illegible]

EG&G IDAHO INC.
Page 2

EG&G IDAHO INC.
Page 2

Date: 05/09/89

Page: 2 of 4

[illegible]

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EG&G IDAHO INC.
Page 4

EG&G IDAHO INC.
Page 4

Page: 4 of 4

PROJECT ISV Production Power

TYPE OF EST. Planning

[illegible]

ESCALATION SHEET

Project
or Description : ISV Production Power
Location : INEL
Requested By : J. M. Beller

Date : 05/09 /87
Page : 1 of 1
Prepare'd By : P. J. Hill
Chk'd/appr'd By :

Fiscal Years	FY89	FY90	FY91	FY92	FY93	FY94	FY95	FY96	////////
Calendar Years	CY89	CY90	CY91	CY92	CY93	CY94	CY95	CY96	TOTAL
Escalated Months & Yearly Percentage	JFMAMJJASOND Months Yrs %	JFMAMJJASOND Months Yrs %	JFMAMJJASOND Months Yrs %	JFMAMJJASOND Months Yrs %	JFMAMJJASOND Months Yrs %	JFMAMJJASOND Months Yrs %	JFMAMJJASOND Months Yrs %	JFMAMJJASOND Months Yrs %	COM- POUNDED %
Title I, II	8 3.0	12 5.3	12 5.4	12 5.8	12 6.0	3 1.5	0 0.0	0 0.0	30.13%
Title III	8 3.0	12 5.3	12 5.4	12 5.8	12 6.0	12 6.0	12 6.0	6 3.0	48.37%
Construction Period	JFMAMJJASOND	JFMAMJJASOND	JFMAMJJASOND	JFMAMJJASOND	JFMAMJJASOND	JFMAMJJASOND	JFMAMJJASOND	JFMAMJJASOND	
Labor	8 3.0	12 5.2	12 5.5	12 5.8	12 6.1	12 6.1	12 6.1	3 1.5	46.66%
Mat'l & Subcontracts	8 2.7	12 4.4	12 4.7	12 5.2	12 5.4	12 5.4	12 5.4	3 1.4	40.10%
Equipment	8 2.7	12 4.4	12 4.7	12 5.2	12 5.4	12 5.4	12 5.4	3 1.4	40.10%
Indirects	8 3.0	12 5.2	12 5.5	12 5.8	12 6.1	12 6.1	12 6.1	3 1.5	46.66%
PM	8 3.0	12 5.3	12 5.4	12 5.8	12 6.0	12 6.0	12 6.0	3 1.5	46.21%
CM	8 3.0	12 5.3	12 5.4	12 5.8	12 6.0	12 6.0	12 6.0	6 3.0	48.37%
FE	8 3.0	12 5.3	12 5.4	12 5.8	12 6.0	12 6.0	12 6.0	6 3.0	48.37%
Equipment & Material	4.0	4.4	4.7	5.2	5.4	5.4	5.4	5.4	
Construction Labor	4.5	5.2	5.5	5.8	6.1	6.1	6.1	6.1	
Construction Indirects	4.5	5.2	5.5	5.8	6.1	6.1	6.1	6.1	
Title I, II, III	4.5	5.3	5.4	5.8	6.0	6.0	6.0	6.0	
PM-CM-FE	4.5	5.3	5.4	5.8	6.0	6.0	6.0	6.0	
Composite	4.4	4.8	5.1	5.6	5.7	5.7	5.7	5.7	